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3,347,010

METAL ROOF DECK

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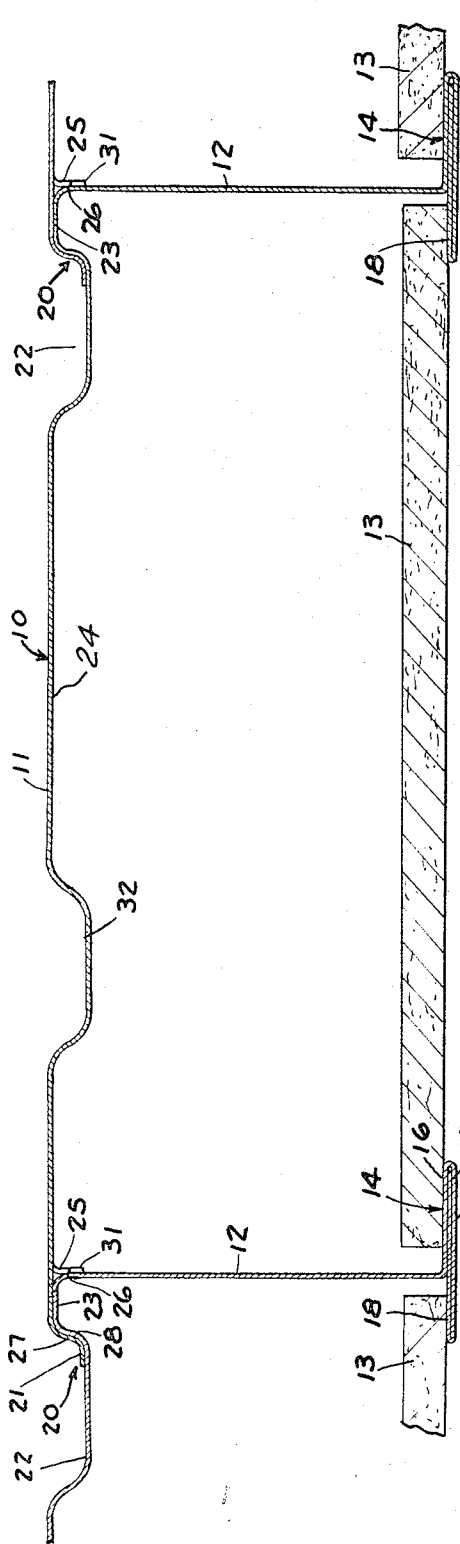


FIG. 2

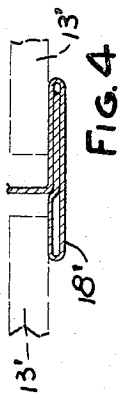


FIG. 3

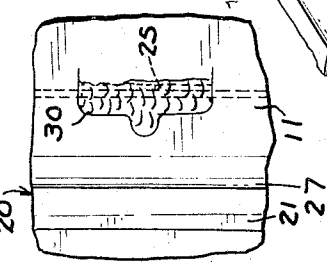


FIG. 4

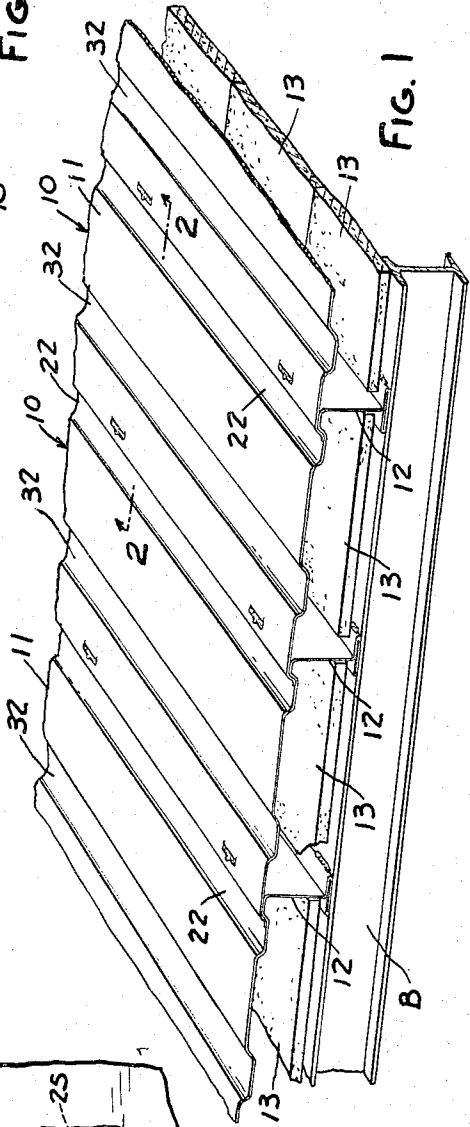


FIG. 1

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METAL ROOF DECK

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17 Claims. (Cl. 52—593)

ABSTRACT OF THE DISCLOSURE

The roof deck disclosed herein comprises a plurality of substantially identical deck sections, each of which has a deck portion and a web portion extending downwardly from one edge of the deck portion at a generally right angle. The lower edge of each web portion has flanges extending horizontally therefrom for supporting ceiling tiles. The other edge of the deck portion is free and bent downwardly and extends into a groove in the adjacent deck portion. A plurality of longitudinally spaced tabs are bent downwardly from each deck portion and define openings. The tabs engage the area of juncture of the deck portion and web portion of the adjacent roof deck section and weld material is provided in the openings to bond the adjacent roof deck sections to one another.

This invention relates to metal roof deck and particularly to sheet metal roof deck comprising longitudinally extending interlocked roof deck sections.

It has heretofore been common to make a roof deck by positioning roof deck sections across beams wherein each roof deck section includes a generally horizontal deck portion and a web portion bent downwardly from one edge of the deck portion. The lower end of each web portion is formed with horizontal flanges that support ceiling tiles. In such constructions, the free edge of each deck portion can be interlocked mechanically to the adjacent web portion by engagement in a groove of an adjacent web portion as shown in the patent to Schaffert 1,913,342 or may be welded to the adjacent deck portion as shown in the patent to Howard 1,900,711.

In the former construction, accurate construction of the deck structure is required. In the latter construction, there is a danger that the roof deck will not support a load before the sections are welded to one another. In addition, it is necessary that a welding layout be made in the field to guide the welder in the welding. Further, the constructions heretofore used often result in undue stresses after welding which distort the roof deck.

It is therefore an object of this invention to provide a metal roof deck construction which obviates the disadvantages of the prior art constructions; which is stronger; which can be readily adapted in design to various strength requirements; which provides a ready guide to the welder in the field thereby eliminating field layout of welds thereby improving the quality of the roof deck and reducing the cost of construction; and wherein weld shrinkage as a detrimental factor is obviated.

In the drawings:

FIG. 1 is a fragmentary perspective view of a metal roof deck construction embodying the invention.

FIG. 2 is a fragmentary sectional view taken along the line 2—2 in FIG. 1.

FIG. 3 is a fragmentary plan view of the roof deck construction shown in FIGS. 1 and 2.

FIG. 4 is a fragmentary sectional view of a modified form of roof deck.

Referring to FIG. 1, the roof deck construction embodying the invention comprises a plurality of longitudinally

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extending sheet metal roof deck sections 10 which are mounted in side-by-side relationship on beams B.

As shown in FIG. 2, each roof deck section 10 includes a generally horizontally extending deck portion 11 and a web portion 12 extending downwardly from one edge of the deck portion 11 at a generally right angle. Each roof deck section 10 is preferably made of a single sheet of metal and the lower end of each web 12 is bent as shown in FIG. 2 to provide horizontal flanges which support acoustical ceiling tiles 13 and the like. Referring specifically to FIG. 2, one flange 14 is formed by bending back and forth and bringing the free end 15 between upper and lower layers 16, 17. This, in turn, forms the other flange 18 as shown.

As further shown in FIG. 2, the other edge 20 of each deck portion 11 is free and bent downwardly and preferably has a horizontal end 21. The edge 20 is adapted to extend into a groove 22 which is spaced from but adjacent to the web portion 12. As shown in FIG. 2, a ledge 23 is thereby formed between the groove 22 and web portion 12. The ledge 23 is spaced from the level of the central portion 24 of deck portion 11 by the thickness of the material. As further shown in FIG. 2, the configuration of the free edge 20 is generally complementary to the corresponding surface of the groove 22 which is contacted by it.

Referring to FIGS. 2 and 3, a plurality of tabs 25 are struck downwardly from the plane of the deck portion 11 inwardly toward web portion 12 and are adapted to engage the area of juncture of the deck portion 11 and the web portion 12 as at 26. The slots 30, which are formed by bending the tabs 25 downwardly, provide welding openings which are filled with welding material by the welder to bond the adjacent sections next to one another. Since a weld is provided along all the edges of slots 30, a stronger construction is achieved than if the free edges 21 were welded to the groove 22.

In order to provide sufficient strength and control the horizontal spacing without increasing the weld area, fingers 31, which extend downwardly from the tabs, may be provided, the distance between the fingers and the wall 27 preferably being substantially equal to the wall 28 and web portion 12 thereby positioning the deck section 10 laterally with respect to an adjacent deck section 10. Where no fingers are provided, the spacing between the wall 27 and tabs 25 is substantially equal to the width between the wall 28 of groove 22 and the web portion 12 thereby positioning the deck section 10 laterally with respect to an adjacent deck section 10.

By this arrangement, the deck sections can be assembled on the beams and workmen can walk along the deck sections even before any welding is accomplished.

It can be seen that the openings 30 provide predetermined areas for the welder without the necessity for making a welding layout in the field. By adjusting the spacing of the openings 30 at the factory, the amount of weld is controlled resulting in a more accurate construction without waste as might occur with a welder making a judgment in the field as to the amount of weld. Since the roof deck sections are positioned mechanically relative to one another before welding, the resultant welding does not produce stresses which distort the relative relationship of the deck and web portions.

In order to provide substantial strength, an additional groove 32 is provided in the deck portion 11. As shown, the grooves 22, 32 are of substantial width thereby minimizing the width of the intervening flat portion 24 and further strengthening the deck section.

A further advantage of the construction shown is that the same bending rolls can be used for bending deck sections of different gauge thicknesses and the positions of

the tabs 25 horizontally can be adjusted to compensate for the various gauges of metal.

In the modified form of the deck section shown in FIG. 4, the horizontal flange 18 has the upper and lower portions thereof spaced from one another so that the tile 13' is held at both ends at substantially the same level, that is, the distance between the upper surface and the lower surface of each horizontal flange is substantially equal to three times the thickness of the material.

Instead of filling the openings 30 with weld material, fillet welds can be provided along the longitudinal edges of the openings.

It can thus be seen that there has been provided a metal roof deck construction which obviates the disadvantages of the prior art constructions; which is stronger; which can be readily adapted in design to various strength requirements; which provides a ready guide to the welder in the field thereby eliminating field layout of welds and improving the quality of the roof deck and reducing the cost of construction; and wherein weld shrinkage as a detrimental factor is obviated.

I claim:

1. In a metal roof deck, the combination comprising a roof deck section including a deck portion and a web portion extending downwardly from one edge of the deck portion at a substantially right angle, said web portion having horizontally extending flanges along the lower edge adapted to support ceiling tile and the like, the other edge of said deck section being free and turned downwardly, said deck portion having a groove therein adjacent to but spaced from said one edge along said web, the free end of said deck section adapted to extend into the groove of an adjacent roof deck section, and means on said deck portion spaced from but adjacent to said free edge and extending downwardly for engaging the area of juncture of the deck portion and the web portion of a substantially identical adjacent roof deck section, the distance between said downwardly turned portion of the free end and said downwardly extending means is substantially equal to the distance between the wall of said groove and said web portion and generally confining said roof deck section laterally with respect to the adjacent roof deck section.

2. The combination set forth in claim 1 wherein said groove and said free end have complementary shapes.

3. The combination set forth in claim 1 wherein the deck portion between the wall of said groove and said web is spaced vertically beneath the major portion of said deck by the thickness of said deck material.

4. The combination set forth in claim 1 wherein the horizontal width of said groove is substantially greater than the width of the free end portion of said deck portion.

5. In a metal roof deck, the combination comprising a roof deck section including a deck portion and a web portion extending downwardly from one edge of the deck portion at a substantially right angle, said web portion having horizontally extending flanges along the lower edge adapted to support ceiling tile and the like, the other edge of said deck section being free and turned downwardly, said deck section having a groove therein adjacent to but spaced from said one edge along said web, the free end of said deck section adapted to extend into the groove of an adjacent roof deck section, and means on said deck section spaced from said free edge and extending downwardly for engaging the area of juncture of said deck portion and web portion of an adjacent roof deck section and generally confining said roof deck section laterally with respect to the adjacent roof deck section,

said last-mentioned means comprising longitudinally

spaced tabs extending downwardly from said deck portion.

6. The combination set forth in claim 5 including fingers extending downwardly from said tabs.

7. In a metal roof deck, the combination comprising a roof deck section made of a single sheet of material including a deck portion and a web portion extending downwardly from one edge of the deck portion at a substantially right angle, said web portion having horizontally extending flanges along the lower edge adapted to support ceiling tile and the like, the other edge of said deck section being free and turned downwardly, said deck section having a groove therein adjacent to but spaced from said one edge along said web, the free end of said deck section adapted to extend into the groove of an adjacent roof deck section, and longitudinally spaced tabs on said deck section spaced from said free edge and extending downwardly for engaging the area of juncture of said deck portion and web portion of an adjacent roof deck section and generally confining said roof deck section laterally with respect to the adjacent roof deck section.

8. The combination set forth in claim 7 wherein said groove and said free end have complementary shapes and the distance between said free end and said downwardly extending tabs is generally equal to the distance between the wall of said groove and said web.

9. In a roof deck, the combination comprising a plurality of deck sections, each said deck section comprising a deck portion and a web portion extending downwardly from one edge of said deck portion at a generally right angle, the lower edge of said web portion having flanges extending horizontally therefrom for supporting ceiling tiles, the other edge of said deck portion being free and bent downwardly, said deck portion having a groove formed therein adjacent but spaced from said web portion along said one edge of said deck portion, said free edge adapted to extend downwardly into the groove of an adjacent deck section, a plurality of longitudinally spaced tabs extending along each said deck section and bent downwardly therefrom in spaced relation to said free end and thereby defining openings in said deck portion, said tabs engaging the area of juncture of said deck portion and said web portion of an adjacent roof deck section, and weld material in said openings and bonding said adjacent roof deck sections to one another.

10. The combination set forth in claim 9 wherein said tabs include downwardly extending fingers which extend along said web portion.

11. The combination set forth in claim 9 wherein the horizontal distance between said free end portion of each said section and the adjacent tabs is substantially equal to the horizontal distance between the adjacent side wall of said groove and said web portion.

12. The combination set forth in claim 9 wherein said free edge and said groove have complementary wall surfaces.

13. The combination set forth in claim 9 wherein the horizontal width of said groove is substantially greater than the width of the free end portion of said deck portion.

14. In a roof deck, the combination comprising a deck section comprising a plurality of deck sections, each said deck portion and a web portion extending downwardly from one edge of said deck portion at a generally right angle,

the lower edge of said web portion having flanges ex-

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tending horizontally therefrom for supporting ceiling tiles,
the other edge of said deck portion being free and bent downwardly,
said deck portion having a groove formed therein adjacent but spaced from said web portion along said one edge of said deck portion,
said free edge of one deck section extending downwardly into the groove of the adjacent deck section, a plurality of longitudinally spaced openings in said deck section in spaced relation to said free end adjacent to and overlying the area of juncture of said deck portion and web portion of the adjacent deck section,
and weld material in said openings of said deck section and at the area of juncture of said deck portion and web portion of the adjacent deck section and bonding said adjacent roof deck sections.
15. In a roof deck, the combination comprising a deck section made of a single sheet of material and comprising a deck portion and a web portion extending downwardly from one edge of said deck portion at a generally right angle,
the lower edge of said web portion having flanges extending horizontally therefrom for supporting ceiling tiles,
the free edge of said deck portion being bent downwardly,
said deck portion having a groove formed therein adjacent but spaced from said web portion along said one edge of said deck portion,

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said free edge adapted to extend downwardly into the groove of the adjacent deck section,
a plurality of longitudinally spaced tabs extending along said deck section and bent downwardly therefrom in spaced relation to said free end and thereby defining openings in said deck portion,
said tabs adapted to engage the area of juncture of said deck portion and web of an adjacent roof deck section and adapted to receive weld material for bonding said adjacent roof deck sections.
16. The combination set forth in claim 15 wherein said tabs include downwardly extending fingers which extend along said web.
17. The combination set forth in claim 15 wherein the horizontal distance between said free end portion of each said section and the adjacent tabs is substantially equal to the horizontal distance between the adjacent side wall of said groove and said web portion.

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